Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways Software Configuration Guide

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CONTENTS

Preface v

CHAPTER 1 **Understanding Interface Numbering and Cisco IOS Software Basics** 1-1

About the Voice Gateways 1-1

Port Numbering Conventions 1-1

Understanding Cisco IOS Software Basics 1-3

About Cisco IOS Software 1-3

Getting Help 1-4

Command Modes 1-4

Undoing a Command or Feature 1-5

Saving Configuration Changes 1-5

Upgrading to a New Cisco IOS Release 1-6

Typical Voice Gateway Deployment Scenario 1-6

Where to Go Next 1-6

CHAPTER 2 **Configuring Your Voice Gateway Using the setup Command** 2-1

About Configuring Your Voice Gateway 2-1

Preparing to Configure Your Cisco Voice Gateway 2-1

Using the setup Command 2-2

Completing the Configuration 2-5

CHAPTER 3 **Configuring Your Voice Gateway Using the CLI** 3-1

Configuring the Hostname and Password 3-1

Verifying the Hostname and Password 3-2

Configuring Fast Ethernet Interfaces 3-3

Saving Configuration Changes 3-5

CHAPTER 4 **Configuring Voice** 4-1

Prerequisites 4-1

Configuring the Voice Interface 4-1

Auto-Configuration on the Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways 4-3

Restriction for Configuring Auto-Configuration 4-3

Auto-Configuration With a DHCP Server 4-3
Auto-Configuration Without a DHCP Server 4-5
Configuring the Voice Interface for Cisco Unified Communications Manager 4-7
Configuring the MAC Address Convention 4-10
Configuring Calls 4-11
Call Transfer 4-11
Call Waiting 4-12
Three-Party Conferencing 4-12
Caller ID 4-12

APPENDIX A **Using the ROM Monitor** A-1
Entering the ROM Monitor Mode A-1
About the ROM Monitor Commands A-2
Listing the ROM Monitor Commands A-3
Command Descriptions A-3
Recovering Boot and System Images A-4
Using the Configuration Register A-5
About Changing the Configuration Register A-5
Changing the Configuration Register Manually A-5
Changing the Configuration Register Using Prompts A-5
Using the Console Download Function A-6
About the Console Download Function A-6
Command Description A-6
Error Reporting A-7
Using Debug Commands A-7
Exiting the ROM Monitor Mode A-8

INDEX

Preface

This preface describes the objectives, audience, and conventions of this document, and where to get the latest version of documentation.

- Document Objectives, page v
- Audience, page v
- Documentation Conventions, page vi
- Accessibility, page vi
- Related Documentation, page vii
- Obtaining Documentation and Submitting a Service Request, page vii

Document Objectives

After installing a Cisco VG202, Cisco VG202XM, Cisco VG204, or Cisco VG204XM voice gateway, use this guide to complete a basic configuration. This guide also contains information on using the Cisco IOS software to perform other configuration tasks, such as configuring a VoIP interface and other features.

This guide does not provide complete configuration instructions. See the Cisco IOS configuration guides and command references for detailed configuration instructions.

Audience

This document is designed for the person who will be responsible for configuring your voice gateway. This guide is intended primarily for the following audiences:

- Customers with technical networking background and experience.
- System administrators who are familiar with the fundamentals of voice gateway-based internetworking, but who might not be familiar with Cisco IOS software.
- System administrators who are responsible for installing and configuring internetworking equipment, and who are familiar with Cisco IOS software.

Documentation Conventions

Table 1 Documentation Conventions

Convention	Description
boldface font	Commands and keywords.
italic font	Variables for which you supply values.
[ ]	Keywords or arguments that appear within square brackets are optional.
{x | y | z}	A choice of required keywords appears in braces separated by vertical bars. You must select one.
`screen font`	Examples of information displayed on the screen.
`boldface screen font`	Examples of information you must enter.
< >	Nonprinting characters, for example passwords, appear in angle brackets in contexts where italic font is not available.
[ ]	Default responses to system prompts appear in square brackets.

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this publication.

Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Tip Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

Accessibility

You can configure the Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways by using the Cisco command-line interface (CLI). The CLI conforms to code 508 because it is text based and relies on a keyboard for navigation. You can configure and monitor all functions of the voice gateway through the CLI.

For a complete list of guidelines and Cisco products' adherence to accessibility, see Cisco Accessibility Products at the following URL:

http://www.cisco.com/web/about/responsibility/accessibility/products

Related Documentation

The documents described here are available online. To be sure that you are obtaining the latest information, you should access the online documentation.

To access online user documentation (in both PDF and HTML formats), go to Cisco.com. Under **Documentation**, select **Voice and Unified Communications**, select **Voice Gateway**, and then select **Cisco VG200 Series Gateways**.

- *Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways Hardware Installation Guide*
- *Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways Quick Start Guide*
- *Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways Software Configuration Guide (*this document)
- *Regulatory Compliance and Safety Information for the Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways*

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

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Understanding Interface Numbering and Cisco IOS Software Basics

- About the Voice Gateways, page 1-1
- Port Numbering Conventions, page 1-1
- Understanding Cisco IOS Software Basics, page 1-3
- Typical Voice Gateway Deployment Scenario, page 1-6
- Where to Go Next, page 1-6

About the Voice Gateways

Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways deliver analog voice gateways for the service provider as well as commercial and enterprise unified communication markets. These voice gateways provide voice connectivity to devices such as analog phones, fax machines, and modems.

Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways provide support for 2-FXS (Cisco VG202 and Cisco VG202XM) and 4-FXS (Cisco VG204 and Cisco VG204XM) ports, each supporting independent telephone numbers giving you two or four separate lines, and parity with Cisco IOS fax/modem, security, and Session Initiation Protocol (SIP) features. Both voice gateways are configurable with Cisco Unified Communications Manager (CUCM) & Cisco Unified Communications Manager Express (CUCME).

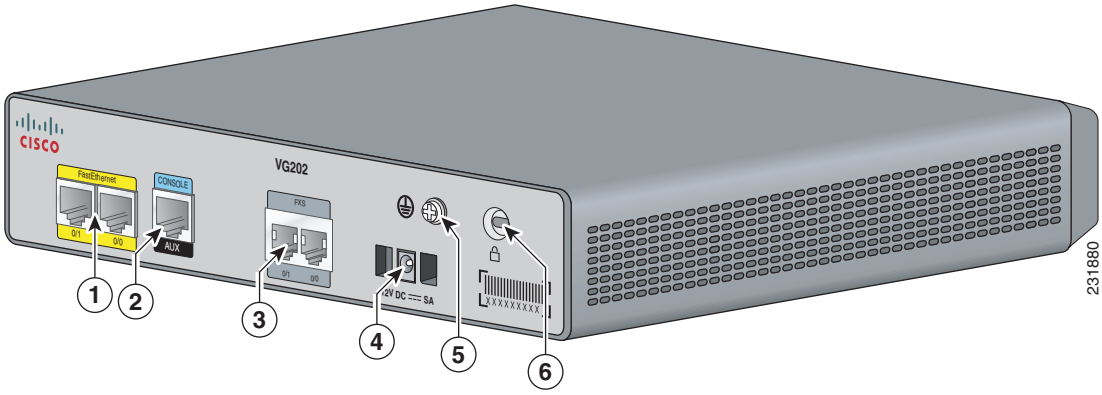
Note Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways are fixed voice gateways and do not support interface cards.

Port Numbering Conventions

The Cisco VG202 voice gateway supports two RJ-11 ports and supports two FXS voice ports with two 10/100 Fast Ethernet ports. Figure 1-1 shows the interfaces and ports on the Cisco VG202 voice gateway. All interface ports are on the back of the chassis.

Note The Cisco VG202 and the Cisco VG202XM chassis are identical. The only difference is the model number on the top center. On the Cisco VG202 chassis, the faceplate label says VG202. On the Cisco VG202XM chassis, the faceplate label says VG202XM.

Figure 1-1 Back Panel Feature Locations on the Cisco VG202 Chassis

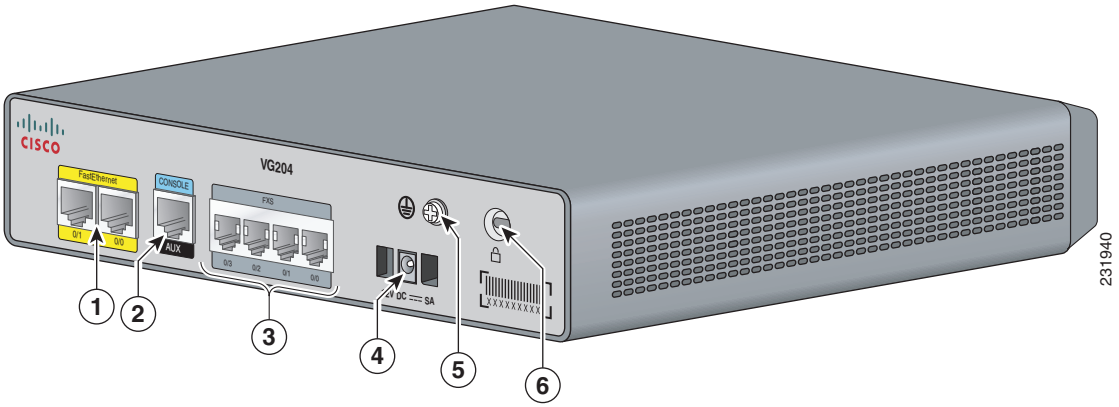


1	Fast Ethernet port 1, Fast Ethernet port 0	**2**	Serial port—console or auxiliary	**3**	FXS ports
4	Power connector	**5**	Chassis ground connection	**6**	Kensington security slot

The Cisco VG204 voice gateway supports four RJ-11ports and supports four FXS voice ports with two 10/100 Fast Ethernet ports. Figure 1-2 shows the interfaces and ports on the Cisco VG204 voice gateway. All interface ports are on the back of the chassis.

Note The Cisco VG204 and the Cisco VG204XM chassis are identical. The only difference is the model number on the top center. On the Cisco VG204 chassis, the faceplate label says VG204. On the Cisco VG204XM chassis, the faceplate label says VG204XM.

Figure 1-2 Back Panel Feature Locations on the Cisco VG204 Chassis



1	Fast Ethernet port 1, Fast Ethernet port 0	**2**	Serial port—console or auxiliary	**3**	FXS ports
4	Power connector	**5**	Chassis ground connection	**6**	Kensington security slot

Port numbering conventions for the Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways are as follows:

- Foreign Exchange Station (FXS) voice port numbering begins at 0/0 and extends to 0/1 for the Cisco VG202 and Cisco VG202XM, and extends to 0/3for the Cisco VG204 and Cisco VG204XM.
- 10/100BASE-T Fast Ethernet ports are numbered Fast Ethernet 0/0 and Fast Ethernet 0/1, from right to left.

Understanding Cisco IOS Software Basics

- About Cisco IOS Software, page 1-3
- Getting Help, page 1-4
- Command Modes, page 1-4
- Undoing a Command or Feature, page 1-5
- Saving Configuration Changes, page 1-5
- Upgrading to a New Cisco IOS Release, page 1-6

About Cisco IOS Software

Understanding these concepts about the Cisco IOS software will save time as you begin to use the CLI. If you have never used Cisco IOS software or if you need a refresher, take a few minutes to read this chapter before you proceed to the next chapter.

If you are already familiar with Cisco IOS software, proceed to Chapter 2, "Configuring Your Voice Gateway Using the setup Command."

For a comprehensive view of Cisco IOS configuration fundamentals, see the *Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.4*.

Note

- Your Cisco IOS software release may not support all of the features documented in this document. For the latest feature information and caveats, see the release notes for your platform and software release.
- Use the Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access the Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. You do not need an account on Cisco.com to access the Cisco Feature Navigator.

- The VG202 and VG204 devices support IOS software releases 15.0(1)M or earlier* due to memory limitations. The VG202XM and VG204XM devices will support the latest IOS software release 15.3(2)T and beyond. Earlier releases are not supported on the VG202XM and VG204XM. *Deployments requiring support for secure SCCP based call control are supported using 15.1(4)M IOS release.

Getting Help

Use the question mark (?) and arrow keys to help you enter commands:

- For a list of available commands, enter a question mark:

  ```
  VG> ?
  ```

- To complete a command, enter a few known characters followed by a question mark (with no space):

  ```
  VG> s?
  ```

- For a list of command variables, enter the command followed by a space and a question mark:

  ```
  VG> show ?
  ```

- To redisplay a command you previously entered, press the up arrow key. You can continue to press the up arrow key for more commands.

Command Modes

The Cisco IOS user interface involves different modes. Each command mode permits you to configure different components on your voice gateway. The commands available at any given time depend on which mode you are currently in. Entering a question mark (**?**) at the prompt displays a list of commands available for each command mode. Table 1-1 lists the most common command modes.

Table 1-1 Common Command Modes

Command Mode	Access Method	VG Prompt Displayed	Exit Method
User EXEC	Log in.	`VG>`	Use the **logout** command.
Privileged EXEC	From user EXEC mode, enter the **enable** command.	`VG#`	To exit to user EXEC mode, use the **disable**, **exit**, or **logout** command.

Table 1-1 Common Command Modes (continued)

Command Mode	Access Method	VG Prompt Displayed	Exit Method
Global configuration	From the privileged EXEC mode, enter the **configure terminal** command.	`VG(config)#`	To exit to privileged EXEC mode, use the **exit** or **end** command, or press **Ctrl-Z**.
Interface configuration	From the global configuration mode, enter the **interface** *type number* command, such as **interface fast ethernet 0/0**.	`VG(config-if)#`	To exit to global configuration mode, use the **exit** command. To exit directly to privileged EXEC mode, press **Ctrl-Z**.

Timesaver Each command mode restricts you to a subset of commands. If you are having trouble entering a command, check the prompt, and enter the question mark (**?**) for a list of available commands. You might be in the wrong command mode or using the wrong syntax.

In the following example, notice how the prompt changes after each command to indicate a new command mode:

```
VG> enable
Password: <enable password>
VG# configure terminal
VG(config)# interface fastEthernet 0/0
VG(config-if)# line 0
VG(config)# exit
VG#
%SYS-5-CONFIG_I: Configured from console by console
```

The last message is normal and does not indicate an error. Press **Return** to get the `VG#` prompt.

Note You can press **Ctrl-Z** in any mode to immediately return to enable mode (`VG#`), instead of entering **exit**, which returns you to the previous mode.

Undoing a Command or Feature

If you want to undo a command you entered or disable a feature, enter the keyword **no** before most commands; for example, **no ip routing**.

Saving Configuration Changes

You need to enter the **copy running-config startup-config** command to save your configuration changes to NVRAM, so the changes are not lost if there is a system reload or power outage. For example:

```
VG# copy running-config startup-config
Building configuration...
```

It might take a minute or two to save the configuration to NVRAM. After the configuration has been saved, the following appears:

```
[OK]
VG#
```

Upgrading to a New Cisco IOS Release

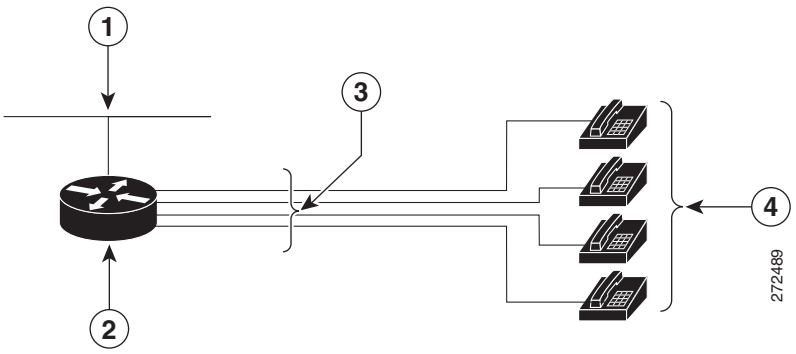
To install or upgrade to a new Cisco IOS release, see *Maintaining System Memory* in the *Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.2*.

Note To simplify network operations and management of Cisco IOS software migration, see the *Basics of a Successful Cisco IOS Software Migration*.

Typical Voice Gateway Deployment Scenario

Figure 1-3 shows a typical deployment scenario for a Cisco VG202, Cisco VG202XM, Cisco VG204, or Cisco VG204XM voice gateway.

Figure 1-3 Analog FXS User Interfaces



1	Ethernet	**2**	Cisco VG204/Cisco VG204XM voice gateway
3	RJ-11 cables	**4**	Analog telephones

Where to Go Next

Now that you have learned some Cisco IOS software basics and seen a typical deployment scenario, you can begin to configure your voice gateway by using the CLI.

Remember that:

- You can use the question mark (?) and arrow keys to help you enter commands.
- Each command mode restricts you to a set of commands. If you have difficulty entering a command, check the prompt and then enter the question mark (**?**) for a list of available commands. You might be in the wrong command mode or be using the wrong syntax.

- To disable a feature, generally enter the keyword **no** before the command; for example, **no ip routing**.
- You need to save your configuration changes to NVRAM so that the changes are not lost if there is a system reload or power outage.

Go to Chapter 2, "Configuring Your Voice Gateway Using the setup Command," to begin configuring your voice gateway.

Configuring Your Voice Gateway Using the setup Command

This chapter describes how to use the setup command to configure your voice gateway. The setup command prompts you to enter information needed to start a voice gateway functioning quickly. The facility steps you through a basic configuration, including LAN interfaces.

- About Configuring Your Voice Gateway, page 2-1
- Preparing to Configure Your Cisco Voice Gateway, page 2-1
- Using the setup Command, page 2-2
- Completing the Configuration, page 2-5

About Configuring Your Voice Gateway

The Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways ship with a default configuration. During the first boot up, the voice gateways do not enter setup mode and are configured through auto-configuration.

If you prefer to configure the voice gateway manually or if you wish to configure a module or interface that is not included in the setup command, proceed to "Chapter 3, "Configuring Your Voice Gateway Using the CLI," for step-by-step instructions.

If you prefer to configure the voice gateway using AutoInstall, see *Using AutoInstall to Remotely Configure Cisco Networking Devices*.

Preparing to Configure Your Cisco Voice Gateway

Procedure

Step 1 Set up the hardware as described in the *Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways Hardware Installation Guide*.

Step 2 Configure your PC terminal emulation program for 9600 baud, 8 data bits, no parity, and 1 stop bit.

Step 3 Determine which network protocols you support.

Step 4 Determine the addressing plan for each network protocol.

Using the setup Command

The setup command is displayed in your PC terminal emulation program window.

Note If you make a mistake while using the setup command, you can exit and run the command again. Press **Ctrl-C**, and enter **setup** at the enable mode prompt (VG#).

Procedure

Step 1 Plug in the external power supply.

The system begins to display messages in your terminal emulation program window.

Caution The voice gateway does not enter setup mode during the initial configuration. During initial configuration, the voice gateway boots up in auto-configuration. You can only use the setup command to configure the voice gateway manually after the initial configuration. Using the setup command during the initial configuration erases the default configuration and must be avoided.

Caution *Do not press any keys on the keyboard until the messages stop*. The system interprets any keys pressed during this time as the first command typed when the messages stop, which might cause the voice gateway to power off and start over. It takes a few minutes for the messages to stop.

The messages look similar to the following example.

```
System configuration has been modified. Save? [yes/no]: n
Proceed with reload? [confirm]

*Apr 21 14:23:38.051: %SYS-5-RELOAD: Reload requested  by console. Reload Reason: Reload
Command.
System Bootstrap, Version 12.4(20080415:092610)
[anyname-VG.V124_19_9_2_PIA9.14582.ios.sync 102], DEVELOPMENT SOFTWARE
Copyright (c) 1994-2008 by cisco Systems, Inc.

VG202 platform with 131072 Kbytes of main memory

Upgrade ROMMON initialized
program load complete, entry point: 0x80020000, size: 0x1437d40
Self decompressing the image:
########################################################################################
########################################################################################
################################## [OK]

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Cisco IOS Software, VG20X Software (VG20X-ADVIPSERVICESK9-M), Version
12.4(ORBITTY_APRIL18_POST_SYNC_BUILD.2008-04-17) UBUILDIT Image, CISCO DEVELOPMENT TEST
VERSION
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 18-Apr-08 02:30 by geopasaaniha


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agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco VG202 (MPC8300) processor (revision 0x100) with 98304K/32768K bytes of memory.
Processor board ID FOC11334C2B
MPC8300 CPU Rev: Part Number 0x8062, Revision ID 0x11
2 FastEthernet interfaces
2 Voice FXS interfaces
256K bytes of non-volatile configuration memory.
126000K bytes of ATA CompactFlash (Read/Write)


         --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: y

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.
```

Step 2 When the following message appears, enter **yes** to begin the initial configuration dialog:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

Step 3 When the following message appears, press **Return** to see the current interface summary:

```
First, would you like to see the current interface summary? [yes]:

Any interface listed with OK? value "NO" does not have a valid configuration

Interface                  IP-Address      OK? Method Status         Protocol
FastEthernet0/0            unassigned      NO  unset  up                    up
FastEthernet0/1            unassigned      NO  unset  up                    down
```

Step 4 Enter a hostname for the voice gateway:

```
Configuring global parameters:
```

```
  Enter hostname [VG]: VG204

The enable secret is a password used to protect access to privileged EXEC and
configuration modes. This password, after entered, becomes encrypted in the configuration.
```

Step 5 Enter an enable secret password. This password is encrypted (more secure) and cannot be seen when viewing the configuration:

```
The enable secret is a password used to protect access to
  privileged EXEC and configuration modes. This password, after
  entered, becomes encrypted in the configuration.
  Enter enable secret: cisco
```

Step 6 Enter an enable password that is different from the enable secret password. This password is *not* encrypted (less secure) and can be seen when viewing the configuration:

```
The enable password is used when you do not specify an
  enable secret password, with some older software versions, and
  some boot images.
  Enter enable password: cisco
% Please choose a password that is different from the enable secret
  Enter enable password: cisco
```

Step 7 Enter the virtual terminal password, which prevents unauthenticated access to the voice gateway through ports other than the console port:

```
The virtual terminal password is used to protect
  access to the VG over a network interface.
  Enter virtual terminal password: cisco
  Configure SNMP Network Management? [yes]: n
Configure IP? [yes]:
    Configure RIP routing? [yes]: n
  Configure bridging? [no]:
```

Step 8 Respond to the following prompts as appropriate for your network:

```
Do you want to configure FastEthernet0/0  interface? [yes]:
  Use the 100 Base-TX (RJ-45) connector? [yes]:
  Operate in full-duplex mode? [no]:
  Configure IP on this interface? [yes]:
    IP address for this interface: 9.13.38.150
    Subnet mask for this interface [255.0.0.0] : 255.255.255.0
    Class A network is 9.0.0.0, 24 subnet bits; mask is /24

Do you want to configure FastEthernet0/1  interface? [yes]: n

Would you like to go through AutoSecure configuration? [yes]: n
AutoSecure dialog can be started later using "auto secure" CLI

The following configuration command script was created:

hostname VG-202
enable secret 5 $1$Y0VQ$D8qM6vS3qId.BP3w.GjlE.
enable password cisco
line vty 0 4
password cisco
no snmp-server
!
ip routing
no bridge 1
!
```

```
interface FastEthernet0/0
media-type 100BaseX
half-duplex
ip address 9.13.38.150 255.255.255.0
!
interface FastEthernet0/1
shutdown
no ip address
dialer-list 1 protocol ip permit
!
end
```

Completing the Configuration

After you have entered all the prompted information for the setup command, the system displays the configuration.

Procedure

Step 1 The system asks if you want to save this configuration, with the following options:

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.
```

If you enter **0**, the system does *not* save the configuration information that you entered, and you return to the voice gateway enable prompt (VG#). Enter **setup** to return to the system configuration dialog.

If you enter **1**, the system returns you to the setup command without saving the configuration.

If you enter **2**, the system saves the configuration and returns you to the user EXEC prompt (VG>).

Step 2 When the messages stop appearing on your screen, press **Return** to get the VG> prompt.

Step 3 The VG> prompt indicates that you are now at the CLI and you have just completed a basic voice gateway configuration. However, this is *not* a complete configuration. At this point you have two choices:

- Run the setup command again and create another configuration. Enter the following:

  ```
  VG> enable
  Password: password
  VG# setup
  ```

- Modify the existing configuration or configure additional features with the CLI as described in Chapter 3, “Configuring Your Voice Gateway Using the CLI.”

Configuring Your Voice Gateway Using the CLI

Follow the procedures in this chapter to manually configure the voice gateway or to change the configuration after you have run the setup command described in the "Configuring Your Voice Gateway Using the setup Command" section on page 2-1.

- Configuring the Hostname and Password, page 3-1
- Configuring Fast Ethernet Interfaces, page 3-3
- Saving Configuration Changes, page 3-5

Note

- This chapter does not describe every configuration possible—only a small portion of the most commonly used configuration procedures. For advanced configuration topics, see the Cisco IOS configuration guide and command reference publications.
- If you skipped Chapter 2, "Configuring Your Voice Gateway Using the setup Command," and you have never configured a voice gateway before, read it now. That chapter contains important information that you need for configuring your voice gateway.

Configuring the Hostname and Password

One of the first configuration tasks is to configure the hostname and set an encrypted password. Configuring a hostname allows you to distinguish multiple voice gateways and routers from each other. Setting an encrypted password allows you to prevent unauthorized configuration changes.

Restriction

You can only specify a hostname if the voice gateway has a DNS server available for hostname resolution.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **hostname** *name*
4. **enable secret password**
5. **line configuration** *line*

6. **exec-timeout** *minutes seconds*
7. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `VG# configure terminal`	Enters global configuration mode. You have entered global configuration mode when the prompt changes to `VG(config)#`.
Step 3	**hostname** *name* **Example:** `VG(config)# hostname VG204`	Changes the name of the voice gateway to a meaningful name.
Step 4	**enable secret password** **Example:** `VG(config)# enable secret guessme`	Enters an enable secret password. This password provides access to privileged EXEC mode. When you press **enter** at the user EXEC prompt (`VG>`), you must enter the enable secret password to gain access to configuration mode. Substitute your enable secret password for `guessme`.
Step 5	**line configuration** *line* **Example:** `VG(config)# line configuration 0`	Enters line configuration mode to configure the console port. When you enter line configuration mode, the prompt changes to `VG(config-line)#`.
Step 6	**exec-timeout** *minutes seconds* **Example:** `VG(config-line)# exec-timeout 0 0`	Prevents the voice gateway's EXEC facility from timing out if you do not type any information on the console screen for an extended period.
Step 7	**exit** **Example:** `VG(config-line)# exit`	Exits to global configuration mode.

Verifying the Hostname and Password

To verify that you configured the correct hostname and password, follow these steps.

Procedure

Step 1 Enter the **show config** command:

```
VG# show config
```

```
Using 1888 out of 126968 bytes
!
version XX.X
.
.
.
!
hostname VG204
!
enable secret 5 $1$60L4$X2JYOwoDc0.kqa1loO/w8/
.
.
.
```

Step 2 Check the hostname and encrypted password displayed near the top of the command output.

Step 3 Exit global configuration mode and attempt to reenter it, using the new enable password:

```
VG# exit
.
.
.
VG con0 is now available
Press RETURN to get started.
VG> enable
Password: guessme
VG#
```

Tip If you are having trouble, ensure the following:

- Caps lock is off.
- You entered the correct passwords. Passwords are case sensitive.

Configuring Fast Ethernet Interfaces

To configure a Fast Ethernet interface, use the configuration software provided with your voice gateway. Otherwise, for greatest power and flexibility, use configuration mode (manual configuration).

This section describes basic Fast Ethernet interface configuration, including enabling the interface and specifying IP routing. Depending on your own requirements and the protocols you plan to route, you might also need to enter other configuration commands.

Before You Begin

- Connect a console to the voice gateway.
- Power on the voice gateway by plugging in the external power supply.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip routing**

4. **interface** *type number*
5. **ip address** *ip address subnet mask*
6. **exit**
7. **Ctrl-z**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `VG# configure terminal`	Enters global configuration mode.
Step 3	**ip routing** **Example:** `VG(config)# ip routing`	Enables routing protocols as required for your global configuration. This example uses IP routing.
Step 4	**interface** *type [number]* **Example:** `VG(config)# interface fastethernet 0/0`	Enters interface configuration mode. You have entered interface configuration mode when the prompt changes to `VG(config-if)#`.
Step 5	**ip address** *ip address subnet mask* **Example:** `VG(config-if)# ip address 172.16.74.3 255.255.255.0`	Assigns an IP address and subnet mask to the interface.

Step 6	`exit`
	
	Example:
	`VG(config-if)# exit`
		Exits to global configuration mode.
		
		Repeat Step 4 through Step 6 if your voice gateway has more than one interface to configure.

Step 7	**Ctrl-z** **Example:** `VG# Ctrl-z`	Returns to enable mode when you finish configuring interfaces.

Example

The following example shows how to configure the Fast Ethernet interface on the voice gateway:

```
VG-204(config)#int fa0/0
VG-204(config-if)#ip add
VG-204(config-if)#ip address 9.13.38.149 255.255.255.0
VG-204(config-if)#do sh runn int fa0/0
Building configuration...
```

```
Current configuration : 96 bytes
!
interface FastEthernet0/0
 ip address 9.13.38.149 255.255.255.0
 speed auto
 half-duplex
end
```

Saving Configuration Changes

Perform the following steps to save the voice gateway configuration.

SUMMARY STEPS

1. **enable**
2. **copy running-config startup-config**
3. **Ctrl-z**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**copy running-config startup-config** **Example:** `VG# copy running-config startup-config`	Saves the configuration changes to NVRAM so that they are not lost during resets, power cycles, or power outages.
Step 3	**Ctrl-z** **Example:** `VG# Ctrl-z`	Returns to enable mode when you finish configuring the interfaces.

Configuring Voice

This chapter explains how to configure voice interfaces and ports, which convert telephone voice signals for transmission over an IP network.

This chapter presents the following major topics:

- Prerequisites, page 4-1
- Configuring the Voice Interface, page 4-1

VoIP enables your Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways to carry live voice traffic (for example, telephone calls and faxes) over an IP network. VoIP offers the following benefits:

- Toll bypass
- Unified voice and data trunking
- Plain old telephone service (POTS)–Internet telephony gateways

For more information on understanding and configuring VoIP, see *Configuring Voice over IP*.

Prerequisites

Before you can configure your Cisco voice gateway to use VoIP, you must first do the following:

- Establish a working IP network.
- Implement a dial plan, including the following tasks:
  - Complete your company's dial plan. That is, decide what patterns of dialed numbers will access what telephony endpoints.
  - Establish a working telephony network based on your company's dial plan.
  - Integrate your dial plan and telephony network into your existing IP network topology.

Configuring the Voice Interface

Whenever you install a new interface or want to change the configuration of an existing interface, you must configure the interface.

Note The Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways are fixed voice gateways and do not support interface cards.

Before you configure an interface, have the following information available:

- Protocols you plan to route on the new interface
- IP addresses, subnet masks, network numbers, zones, or other information related to the routing protocol

Timesaver Obtain this information from your system administrator or network plan before you begin configuring your voice gateway.

To configure a voice interface, you must use configuration mode (manual configuration). In this mode, you can enter Cisco IOS commands through the CLI.

Procedure

Step 1 Connect a console to the voice gateway as described in the *Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways Hardware Installation Guide*.

Step 2 Power on the voice gateway. If the current configuration is no longer valid, after about one minute you see the following prompt:

```
Would you like to enter the initial dialog? [yes/no]:
```

Answer **no**. You now enter the normal operating mode of the voice gateway.

Note If the current configuration is valid, you enter the normal operating mode automatically.

Step 3 After a few seconds, you see the user EXEC prompt (`VG>`). Type **enable** and the password to enter enable mode:

```
VG> enable
Password: <password>
```

The prompt changes to the privileged EXEC (enable) prompt (`VG#`):

```
VG#
```

Step 4 Enter the **configure terminal** command to enter configuration mode:

```
VG# configure terminal
VG(config)#
```

The voice gateway enters global configuration mode, indicated by the `VG(config)#` prompt.

Step 5 If you have not configured the voice gateway before, or you want to change the configuration, use Cisco IOS commands to configure global parameters, passwords, network management, and routing protocols. In this example, IP routing is enabled:

```
VG(config)# ip routing
```

For complete information about global configuration commands, see the Cisco IOS configuration guides and command references.

Step 6 To configure another interface, enter the **exit** command to return to the `VG(config)#` prompt.

Step 7 To configure the voice gateway for voice traffic, see the VoIP references in the "Prerequisites" section on page 4-1.

Step 8 To exit configuration mode and return to the enable prompt, when you finish configuring interfaces, press **Ctrl-Z**. To see the current operating configuration, including any changes you just made, enter the **show running-config** command:

```
VG# show running-config
```

To see the configuration currently stored in NVRAM, enter the **show startup-config** command at the enable prompt:

```
VG# show startup-config
```

Step 9 The results of the **show running-config** and **show startup-config** commands differ if you have made changes to the configuration but have not yet written them to NVRAM. To write your changes to NVRAM and make them permanent, enter the **copy running-config startup-config** command at the enable prompt:

```
VG# copy running-config startup-config
Building configuration. . .
[OK]
VG#
```

The Cisco voice gateway is now configured to boot in the new configuration.

Auto-Configuration on the Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways

To configure auto-configuration on the Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways, follow these guidelines and procedures.

- Restriction for Configuring Auto-Configuration
- Auto-Configuration on the Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM Voice Gateways
- Configuring the Voice Interface for Cisco Unified Communications Manager
- Configuring the MAC Address Convention

Restriction for Configuring Auto-Configuration

Before you can connect the voice gateway to the network, you must provision the Cisco Unified Communications Manager (CUCM) with the voice gateway information.

Auto-Configuration With a DHCP Server

When the Dynamic Host Configuration Protocol (DHCP) server is available, the voice gateway sends a DHCP server request to provide the IP address for the Fast Ethernet 0/0 interface, and the TFTP server's IP address using the DHCP option 150. When the DHCP server provides the information, the voice

gateway provisions itself with the CUCM configuration using Skinny Call Control Protocol (SCCP). Analog ports which have been pre-configured on CUCM automatically register on CUCM as SCCP-controlled ports.

To provision the voice gateway with auto-configuration when a DHCP server is available, use the following commands.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type slot/port*
4. **ip address dhcp**
5. **sccp local** *interface-type interface-number* **port** *port-number*
6. **ccm-manager sccp local** *interface-type interface-number*
7. **ccm-manager sccp**
8. **voice service voip**
9. **fax protocol t38 [nse[force]]**
10. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `VG# configure terminal`	Enters global configuration mode. You have entered global configuration mode when the prompt changes to `VG(config)#`.
Step 3	**interface** *type slot/port* **Example:** `VG(config)# interface fastethernet 0/0`	Enters interface configuration mode and specifies the type of interface you plan to configure. You have entered interface configuration mode when the prompt changes to `VG(config-if)#`.
Step 4	**ip address dhcp** **Example:** `VG(config-if)# ip address dhcp`	Acquires an IP address on an interface from the DHCP.
Step 5	**sccp local** *interface-type interface-number* **port** *port-type* **Example:** `VG(config)# sccp local fastethernet 0/0`	Enables SCCP and its related applications (transcoding and conferencing).

	Command or Action	Purpose
Step 6	**ccm-manager sccp local** *interface-type interface-number* **Example:** `VG(config)# ccm-manager sccp local fastethernet 0/0`	Selects the local interface that the SCCP application uses to register with CUCM.
Step 7	**ccm-manager sccp** **Example:** `VG(config)# ccm-manager sccp`	Enables CUCM autoconfiguration of the Cisco IOS gateway. **Note** The **ccm sccp** command will remove itself if there is no IP address configured. The command checks every 20 seconds, up to a maximum of 8 times, then the Cisco IOS gateway will be automatically unconfigured.
Step 8	**voice service voip** **Example:** `VG(config)# voice service voip`	Enters voice-service configuration mode and specifies a voice-encapsulation type. **Note** This step is not necessary through auto-configuration.
Step 9	**fax protocol t38** [**nse**[**force**]] **Example:** `VG(config)# fax protocol t38 nse force`	Specifies the global default ITU-T T.38 standard fax protocol to be used for all VoIP dial peers. **Note** This step is not necessary through auto-configuration.

Step 10	`exit`
	
	Example:
	`VG(config-line)# exit`
		Exits to global configuration mode.

Auto-Configuration Without a DHCP Server

When the DHCP server is not available, use the following commands to provision the voice gateway with the CUCM configuration.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type slot/port*
4. **ip address** *static ip subnet mask*
5. **sccp local** *interface-type interface-number* **port** *port-number*
6. **voice service voip**
7. **fax protocol t38 [nse[force]]**
8. **ccm-manager sccp local** *interface-type interface-number*
9. **ccm-manager config server** *tftp_ip_address*
10. **ccm-manager sccp**

11. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `VG# configure terminal`	Enters global configuration mode. You have entered global configuration mode when the prompt changes to `VG(config)#`.
Step 3	**interface** *type slot/port* **Example:** `VG(config)# interface fastethernet 0/0`	Enters interface configuration mode and specifies the type of interface you plan to configure. You have entered interface configuration mode when the prompt changes to `VG(config-if)#`.
Step 4	**ip address dhcp** **Example:** `VG(config-if)# ip address dhcp`	Acquires an IP address on an interface from the DHCP.
Step 5	**sccp local** *interface-type interface-number* **port** *port-type* **Example:** `VG(config)# sccp local fastethernet 0/0`	Enables the SCCP and its related applications (transcoding and conferencing).
Step 6	**voice service voip** **Example:** `VG(config)# voice service voip`	Enters voice-service configuration mode and specifies a voice-encapsulation type.
Step 7	**fax protocol t38** [**nse**[**force**]] **Example:** `VG(config)# fax protocol t38 nse force`	Specifies the global default ITU-T T.38 standard fax protocol to be used for all VoIP dial peers.
Step 8	**ccm-manager sccp local** *interface-type interface-number* **Example:** `VG(config)# ccm-manager sccp local fastethernet 0/0`	Selects the local interface that the SCCP application uses to register with CUCM.
Step 9	**ccm-manager config server** *tftp_ip_address* **Example:** `VG(config)# ccm-manager config server tftp 9.13.38.245`	Specifies the TFTP server from which the voice gateway downloads CUCM XML configuration files and enables the system to download the port number of the configuration port.

	Command or Action	Purpose
Step 10	**ccm-manager sccp** **Example:** `VG(config)# ccm-manager sccp`	Enables CUCM auto-configuration of the Cisco IOS gateway.

Step 11	`exit`
	
	Example:
	`VG(config-line)# exit`
		Exits to global configuration mode.

Configuring the Voice Interface for Cisco Unified Communications Manager

To configure voice ports to a CUCM server and set various parameters, including IP address, port number, and version number, use the following commands.

Note The following steps are required only when the voice interface is configured manually and not through auto-configuration.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **stcapp ccm-group** *group-id*
4. **stcapp**
5. **stcapp feature access-code**
6. **stcapp feature speed-dial**
7. **voice-port** *slot-number/port*
8. **timeouts initial** *seconds*
9. **timeouts interdigit** *seconds*
10. **timeouts ringing** *seconds* **infinity**
11. **voice-port** *slot-number/port*
12. **ccm-manager fax protocol [protocol cisco]**
13. **ccm-manager config [server]** *ip-address name seconds*
14. **ccm-manager sccp local** *interface-type* **interface-number**
15. **ccm-manager sccp**
16. **sccp local** *interface-type interface-number* **port** *port-type*
17. **sccp**
18. **sccp ccm group** *group-number*
19. **associate ccm** *identifier-number* **priority** *priority-number*

20. **dial-peer voice** *tags* **pots**
21. **service stcapp**
22. **port** *port-number*
23. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `VG# configure terminal`	Enters global configuration mode. You have entered global configuration mode when the prompt changes to `VG(config)#`.
Step 3	**stcapp ccm-group** *group-id* **Example:** `VG(config)# stcapp ccm-group 1`	Configures the CUCM group number for use by the SCCP Telephony Control Application (STCAPP).
Step 4	**stcapp** **Example:** `VG(config)# stcapp`	Enables STCAPP.
Step 5	**stcapp feature access-code** **Example:** `VG(config)# stcapp feature access-code`	Enables STC application feature access codes and enters their configuration mode.
Step 6	**stcapp feature speed-dial** **Example:** `VG(config)# stcapp feature speed-dial`	Enables STC application feature speed-dial codes and enters their configuration mode.
Step 7	**voice-port** *slot-number/port* **Example:** `VG(config)# voice-port 0/0`	Enters voice-port configuration mode.
Step 8	**timeouts initial** *seconds* **Example:** `VG(config-voiceport)# timeouts initial 60`	Configures the initial digit timeout value for a specified voice port.
Step 9	**timeouts interdigit** *seconds* **Example:** `VG(config)# timeouts interdigit 60`	Configures the interdigit timeout value for a specified voice port.

	Command or Action	Purpose
Step 10	**timeouts ringing** *seconds* **infinity** **Example:** `VG(config)# timeouts ringing infinity`	Configures the timeout value for ringing.

Step 11	**voice-port** *slot-number/port*
	
	Example:
	`VG(config)# voice-port 0/1`
	`VG(config)# voice-port 0/2`
	`VG(config)# voice-port 0/3`
		Enters voice-port configuration mode.

Step 12	**ccm-manager fax protocol** [**protocol cisco**] **Example:** `VG(config)# ccm-manager fax protocol cisco`	Enables fax-relay protocol for endpoints on a gateway.
Step 13	**ccm-manager config** [**server**] *ip-address name* **Example:** `VG(config)# ccm-manager config server 9.13.38.245`	Specifies the TFTP server from which the voice gateway downloads CUCM XML configuration files and enables the download of the configuration.
Step 14	**ccm-manager sccp local** *interface-type* **interface-number** **Example:** `VG(config)# ccm-manager sccp local fastethernet 0/0`	Selects the local interface that the SCCP application uses to register with CUCM.
Step 15	**ccm-manager sccp** **Example:** `VG(config)# ccm-manager sccp`	Enables CUCM auto-configuration of the Cisco IOS gateway.
Step 16	**sccp local** *interface-type interface-number* **port** *port-type* **Example:** `VG(config)# sccp local fastethernet 0/0`	Selects the local interface that SCCP applications (transcoding and conferencing) use to register with CUCM.
Step 17	**sccp** **Example:** `VG(config)# sccp`	Enables SCCP protocol and its related applications (transcoding and conferencing).
Step 18	**sccp ccm group** *group-number* **Example:** `VG(config)# sccp ccm group 1`	Creates a CUCM group and enters SCCP CUCM configuration mode.
Step 19	**associate ccm** *identifier-number* **priority** *priority-number* **Example:** `VG(config)# associate ccm 1 priority 1`	Associates a CUCM with a CUCM group and establishes its priority within the group.

	Command or Action	Purpose
Step 20	**dial-peer voice** *tag* **pots** **Example:** `VG(config)# dial-peer voice 999000 pots`	Defines a particular dial peer, to specify the method of voice encapsulation, and to enter dial-peer configuration mode. Tag defines a particular dial peer. The tag range is from 1 to 2147483647. The POTS peer uses VoIP encapsulation on the IP backbone.
Step 21	**service stcapp** **Example:** `VG(config)# service stcapp`	Enables STC application feature service.

Step 22	**port** *port-number*
	
	Example:
	`VG(config)# port 0/0`
	`VG(config)# port 0/1`
	`VG(config)# port 0/2`
		Configures the port number.

Step 23	`exit`
	
	Example:
	`VG(config)# exit`
		Exits to global configuration mode.

Configuring the MAC Address Convention

The voice gateways use the MAC address of the SCC local interface to define unique MAC addresses for each voice port by using the last 9 digits of the SCCP local interface of the voice gateway.

For example, if the source interface MAC address is 000C.8639.5833, the MAC address of the voice port MAC address will be C863.9583.3XXX. In the preceding example, the last 9 digits of the SCCP of the local voice gateway become the first 9 digits of the voice port MAC address after dropping the leading 000.

The last 3 digits of the voice port MAC address is the slot number (3-bit) + subunit number (2-bit) + port number (7-bit) in hexadecimal format. You combine the digits to get the last three MAC address digits.

For example, the voice-port 0/0 is slot number 0 (000): subunit 0 (*00*) and port number 0 (0000000). By stringing the digits together, you get the following: 000*0 0*000 0000 = 0 0 0. This means that if the source interface MAC address is 001f.cac3.b3f8, the MAC address of voice port *0/0* will be 1FCAC3b3f8*000*.

Table 4-1 shows the voice port to MAC address conversion table.

Table 4-1 Voice Port to MAC Address Conversion Chart

Port Number	Last Three Digits of the MAC Address
0/0	000
0/1	001
0/2	002
0/3	003

Configuring Calls

- Call Transfer, page 4-11
- Call Waiting, page 4-12
- Three-Party Conferencing, page 4-12
- Caller ID, page 4-12

Call Transfer

The voice gateways blind-call transfer functionality allows the transfer of a call from the party you call to a destination caller without and call commit from the original person called. For example, party A (transferee) calls party B (transferor). The transferor wants to transfer the call to party C (transfer-target) and uses hookflash (softkey transfer) to get a dial tone, and then dials party C's number. When CUCM/CUCME gets party C's number, it transfers the party A call to party C without the need of committment from party B.

The voice gateways consultation call transfer functionality allows happens after a call is established between a transferor and transferee. The transferor wants to transfer the call to a transfer target by using a softkey transfer by getting a dialtone then dialing the transfer-target's phone number. When the call between the transferor and transfer-target is established, the transferor hangs up the phone to commit the transfer. The CUCM/CUCME connects the call between the transferee and the transfer-target.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **dial-peer voice** *tags* **pots**
4. **service stcapp**
5. **port** *port-number*
6. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `VG# configure terminal`	Enters global configuration mode. You have entered global configuration mode when the prompt changes to `VG(config)#`.

	Command or Action	Purpose

Step 3	**dial-peer voice** *tag* **pots**
	
	Example:
	`VG(config)# dial-peer voice 1000 pots`
	`VG(config)# dial-peer voice 1001 pots`
	`VG(config)# dial-peer voice 1002 pots`
		Defines a particular dial peer, to specify the method of voice encapsulation, and to enter dial-peer configuration mode. Tag defines a particular dial peer. The tag range is from 1 to 2147483647. The POTS peer uses VoIP encapsulation on the IP backbone.

Step 4	**service stcapp** **Example:** `VG(config)# service stcapp`	Enables STC application feature service.

Step 5	**port** *port-number*
	
	Example:
	`VG(config)# port 0/0`
	`VG(config)# port 0/1`
	`VG(config)# port 0/2`
		Configures the port number.

Step 6	`exit`
	
	Example:
	`VG(config)# exit`
		Exits to global configuration mode.

Call Waiting

If a calling party places a call to another party and the other party is engaged in a call, and the called party has call waiting, the party receiving the call can suspend the current telephone call and switch to the incoming call. For example, when caller A is engaged in a call with Caller B, a second call coming in to caller A from caller C will cause caller A to hear the call-waiting tone (one tone with 300ms duration), which indicates a second call. Caller A should be able to use the softkey transfer button to answer the waiting call and then use softkey transfer to switch between the two calls.

To configure call waiting on the voice gateways, use the same commands and configuration shown in "Call Transfer" section on page 4-11.

Three-Party Conferencing

Three-party conferencing provides a three-way conversation between three call parties. The voice gateways along with CUCM support three-party conferencing using Cisco IOS software to perform G.711 (ITU-T standard for audio companding) software mixing for up to three Real-time Transport Protocol (RTP) streams

To configure three-party conferencing on the voice gateways, use the same commands and configuration shown in the "Call Transfer" section on page 4-11.

Caller ID

Caller ID transmits a caller's number to the called party's telephone during the ringing signal.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice-port** *slot-number/port*
4. **caller-id enable** [**type** [**1**|**2**]]
5. **voice-port** *slot-number/port*
6. **caller-id enable** [**type** [**1**|**2**]]
7. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `VG# configure terminal`	Enters global configuration mode. You have entered global configuration mode when the prompt changes to `VG(config)#`.
Step 3	**voice-port** *slot-number/port* **Example:** `VG(config)# voice-port 0/0`	Enters voice-port configuration mode.
Step 4	**caller-id enable** [**type** [**1**|**2**]] **Example:** `VG(config-voice-port)# caller-id enable type 1`	Allows the sending or receiving of caller ID information.
Step 5	**voice-port** *slot-number/port* **Example:** `VG(config)# voice-port 0/1`	Enters voice-port configuration mode.
Step 6	**caller-id enable** [**type** [**1**|**2**]] **Example:** `VG(config-voice-port)# caller-id enable type 2`	Allows the sending or receiving of caller ID information.

Step 7	`exit`
	
	Example:
	`VG(config)# exit`
		Exits to global configuration mode.

Using the ROM Monitor

This appendix describes the ROM monitor (also called the bootstrap program), which is the firmware that runs when you power on or restart the Cisco VG202, Cisco VG202XM, Cisco VG204, or Cisco VG204XM voice gateway. During normal operation, the ROM monitor helps to initialize the processor hardware and boot the operating system software. You can also use the ROM monitor to help you isolate or rule out hardware problems that you encounter while installing your voice gateway.

- Entering the ROM Monitor Mode, page A-1
- About the ROM Monitor Commands, page A-2
- Using the Configuration Register, page A-5
- Using the Console Download Function, page A-6
- Using Debug Commands, page A-7
- Exiting the ROM Monitor Mode, page A-8

Entering the ROM Monitor Mode

To use the ROM monitor, you must be using a terminal or PC that is connected to the voice gateway over the console port.

Perform these steps to configure the voice gateway to boot up in ROM monitor mode the next time it is rebooted.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **config-register** *value*
4. **exit**
5. **reload**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `VG# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `VG# configure terminal`	Enters global configuration mode.
Step 3	**config-register** *value* **Example:** `VG(config)# config-register 0x2102`	Resets the configuration register settings.

Step 4	`exit`
	
	Example:
	`VG(config)# exit`
		Exits to global configuration mode.

Step 5	`reload`
	
	Example:
	`VG# reload`
		Reboots the voice gateway with the new configuration register value. The voice gateway remains in ROM monitor and does not boot the Cisco IOS software.
		
		As long as the configuration value is 0x0, you must manually boot the operating system from the console. See the **boot** command in the "Command Descriptions" section in this appendix.
		
		After the voice gateway reboots, it is in ROM monitor mode. The number in the prompt increments with each new line.

Timesaver Break (system interrupt) is always enabled for 60 seconds after the voice gateway reboots, regardless of whether it is set to on or off in the configuration register. During this 60-second window, you can break to the ROM monitor prompt by pressing the Break key.

About the ROM Monitor Commands

- Listing the ROM Monitor Commands, page A-3
- Command Descriptions, page A-3

Listing the ROM Monitor Commands

Enter **?** or **help** at the ROM monitor prompt to display a list of available commands and options, as follows:

```
rommon 1 > ?
alias              set and display aliases command
boot               boot up an external process
confreg            configuration register utility
cont               continue executing a downloaded image
context            display the context of a loaded image
cookie             display contents of cookie PROM in hex
dev                List the device table
dir                List files in directories-dir <directory>
dis                display instruction stream
frame              print out a selected stack frame
help               monitor builtin command help
history            monitor command history
iomemset           Set IO memory percent
meminfo            main memory information
repeat             repeat a monitor command
reset              system reset
rommon-pref        Select ROMMON
set                display the monitor variables
showmon            Display currently selected ROM monitor
stack              produce a stack trace
sync               write monitor environment to NVRAM
sysret             print out info from last system return
tftpdnld           tftp image download
unalias            unset an alias
unset              unset a monitor variable
xmodem             x/ymodem image download
rommon 1 >
```

Commands are case sensitive. You can halt any command by pressing the Break key on a terminal. If you are using a PC, most terminal emulation programs halt a command when you press the Ctrl and the Break keys at the same time. If you are using another type of terminal emulator or terminal emulation software, see the documentation for that product for information on how to send a Break command.

Command Descriptions

Table A-1 describes the most commonly used ROM monitor commands.

Table A-1 Commonly Used ROM Monitor Commands

Command	Description
help or **?**	Displays a summary of all available ROM monitor commands.

Table A-1 Commonly Used ROM Monitor Commands (continued)

Command	Description

-?	Displays information about command syntax; for example:
	`rommon 16 > dis -?`
	`usage : dis [addr] [length]`
	The output for this command is slightly different for the **xmodem** download command:
	`rommon 11 > xmodem -?`
	`xmodem: illegal option -- ?`
	`usage: xmodem [-cyrxu] <destination filename>`
	`-c  CRC-16`
	`-y  ymodem-batch protocol`

reset or **i**	Resets and initializes the voice gateway, similar to a power up.

dir *device*:	Lists the files on the named device; for example:
	`rommon 5 > dir flash:`
	`Directory of flash:`
	`2 1343152 -rw- cVG204-advipservices-k9.mz`
	`rommon 6 >`

meminfo	Lists the main memory information; for example:
	`rommon 6 > meminfo:`
	`Main memory size: 128 MB.`
	`Available main memory starts at 0x80018000`
	`IO (packet) memory size: 5 percent of main memory`
	`NVRAM size: 128 KB`

boot commands	For more information about the ROM monitor boot commands, see the *Cisco IOS Configuration Fundamentals and Network Management Guide*.
b	Boots the first image in flash memory.
b flash: [*filename*]	Attempts to boot the image directly from the first partition of flash memory. If you do not enter a filename, this command will boot this first image in flash memory.

Recovering Boot and System Images

If your voice gateway experiences difficulties and no longer contains a valid Cisco IOS software image in flash memory, you can recover the Cisco IOS image by using the **xmodem** ROM monitor command. Use this command if the computer attached to your console has a terminal emulator that has xmodem capability. The **xmodem** command establishes a connection between a console and the voice gateway console port for disaster recovery if both the boot and system images are erased from flash memory.

The syntax for the command is **xmodem** [*filename*]. The optional parameter argument *filename* specifies the source file containing the Cisco IOS image. Other options include the following:

- **-c**—Use cyclic redundancy check (CRC-16).
- **-y**—Use Ymodem transfer protocol.

Note The Cisco VG202, Cisco VG202XM, Cisco VG204, and Cisco VG204XM voice gateways only support the **-c** and **-y** options.

Using the Configuration Register

- About Changing the Configuration Register, page A-5
- Changing the Configuration Register Manually, page A-5
- Changing the Configuration Register Using Prompts, page A-5

About Changing the Configuration Register

The virtual configuration register is in nonvolatile RAM (NVRAM) and has the same functionality as other Cisco voice gateways. You can view or modify the virtual configuration register from either the ROM monitor or the operating system software. Within the ROM monitor, you can change the configuration register by entering the register value in hexadecimal format, or by allowing the ROM monitor to prompt you for the setting of each bit.

Changing the Configuration Register Manually

To change the virtual configuration register from the ROM monitor manually, enter the **confreg** command followed by the new value of the register in hexadecimal format, as shown in the following example:

```
rommon 1 > confreg 0x2101

You must reset or power cycle for new config to take effect
rommon 2 >
```

The value is always interpreted as hexadecimal. The new virtual configuration register value is written into NVRAM but does not take effect until you reset or reboot the voice gateway.

Changing the Configuration Register Using Prompts

Entering the **confreg** command without an argument displays the contents of the virtual configuration register and a prompt to alter the contents by describing the meaning of each bit.

In either case, the new virtual configuration register value is written into NVRAM but does not take effect until you reset or reboot the voice gateway.

The following display shows an example of entering the **confreg** command:

```
rommon 7> confreg

     Configuration Summary
enabled are:
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n  [n]:  y
enable  "diagnostic mode"? y/n  [n]:  y
enable  "use net in IP bcast address"? y/n  [n]:
enable  "load rom after netboot fails"? y/n  [n]:
enable  "use all zero broadcast"? y/n  [n]:
enable  "break/abort has effect"? y/n  [n]:
enable  "ignore system config info"? y/n  [n]:
change console baud rate? y/n  [n]:  y
enter rate: 0 = 9600, 1 = 4800, 2 = 1200, 3 = 2400  [0]:  0
```

```
change the boot characteristics? y/n  [n]:  y
enter to boot:
 0 = ROM Monitor
 1 = the boot helper image
 2-15 = boot system
    [0]:  0

Configuration Summary
enabled are:
diagnostic mode
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n  [n]:

You must reset or power cycle for new config to take effect
```

Using the Console Download Function

- About the Console Download Function, page A-6
- Command Description, page A-6
- Error Reporting, page A-7

About the Console Download Function

You can use console download, which is a ROM monitor function, to download either a software image or a configuration file over the voice gateway console port. After download, the file is either saved to the mini-flash memory module or to main memory for execution (image files only).

Use the console download function when you do not have access to a TFTP server.

Note If you want to download a software image or a configuration file to the voice gateway over the console port, you must use the ROM monitor **dnld** command.

Note If you are using a PC to download a Cisco IOS image over the voice gateway console port at 115,200 bps, ensure that the PC serial port is using a 16550 universal asynchronous transmitter/receiver (UART). If the PC serial port is not using a 16550 UART, we recommend using a speed of 38,400 bps or less when downloading a Cisco IOS image over the console port.

Command Description

The syntax for the **xmodem** console download command is **xmodem [-c-y]** *destination_file_name*.

- **-c**—Optional. Performs the download using 16-bit cyclic redundancy check (CRC-16) error checking to validate packets. Default is 8-bit CRC.
- **-y**—Optional. Sets the voice gateway to perform the download using Ymodem protocol. The default is Xmodem protocol. The protocols differ as follows:
  - Xmodem supports a 128-block transfer size. Ymodem supports a 1024-block transfer size.

  - Ymodem uses CRC-16 error checking to validate each packet. Depending on the device that the software is being downloaded from, this function might not be supported by Xmodem

- *destination_file_name*—Name of the system image file or the system configuration file. In order for the voice gateway to recognize it, the name of the configuration file must be *voice gateway_confg*.

Follow these steps to run the xmodem console download command.

Procedure

Step 1 Move the image file to the local drive where Xmodem will execute.

Step 2 Enter the **xmodem** command.

Error Reporting

Because the ROM monitor console download uses the console to perform the data transfer, when an error occurs during a data transfer, the system only displays the error messages on the console after the data transfer terminates.

If you changed the baud rate from the default rate, the error message is followed by a message telling you to restore the terminal to the baud rate specified in the configuration register.

Using Debug Commands

Most ROM monitor debugging commands are functional only when the Cisco IOS software has crashed or stops. If you enter a debugging command and the Cisco IOS crash information is not available, the system displays the following error message:

```
"xxx: kernel context state is invalid, can not proceed."
```

The following are the ROM monitor debugging commands:

- **stack** or **k**—Produces a stack trace; for example:

```
rommon 6> stack
Stack trace:
PC = 0x801111b0
Frame 00: FP = 0x80005ea8    PC = 0x801111b0
Frame 01: FP = 0x80005eb4    PC = 0x80113694
Frame 02: FP = 0x80005f74    PC = 0x8010eb44
Frame 03: FP = 0x80005f9c    PC = 0x80008118
Frame 04: FP = 0x80005fac    PC = 0x80008064
Frame 05: FP = 0x80005fc4    PC = 0xfff03d70
```

- **context**—Displays processor context; for example:

```
rommon 7> context
CPU context of the most recent exception:
PC  = 0x801111b0  MSR = 0x00009032  CR  = 0x53000035  LR    = 0x80113694
CTR = 0x801065e4  XER = 0xa0006d36  DAR = 0xffffffff  DSISR = 0xffffffff
DEC = 0xffffffff  TBU = 0xffffffff  TBL = 0xffffffff  IMMR  = 0xffffffff
R0  = 0x00000000  R1  = 0x80005ea8  R2  = 0xffffffff  R3    = 0x00000000
R4  = 0x8fab0d76  R5  = 0x80657d00  R6  = 0x80570000  R7    = 0x80570000
R8  = 0x00000000  R9  = 0x80570000  R10 = 0x0000954c  R11   = 0x00000000
R12 = 0x00000080  R13 = 0xffffffff  R14 = 0xffffffff  R15   = 0xffffffff
```

```
R16 = 0xffffffff  R17 = 0xffffffff  R18 = 0xffffffff  R19   = 0xffffffff
R20 = 0xffffffff  R21 = 0xffffffff  R22 = 0xffffffff  R23   = 0xffffffff
R24 = 0xffffffff  R25 = 0xffffffff  R26 = 0xffffffff  R27   = 0xffffffff
R28 = 0xffffffff  R29 = 0xffffffff  R30 = 0xffffffff  R31   = 0xffffffff
```

- **frame**—Displays an individual stack frame.
- **sysret**—Displays return information from the last booted system image. This information includes the reason for terminating the image, a stack dump of up to eight frames, and, if an exception is involved, the address where the exception occurred; for example:

```
rommon 8> sysret
System Return Info:
count: 19,  reason: user break
pc:0x801111b0,  error address: 0x801111b0
Stack Trace:
FP: 0x80005ea8, PC: 0x801111b0
FP: 0x80005eb4, PC: 0x80113694
FP: 0x80005f74, PC: 0x8010eb44
FP: 0x80005f9c, PC: 0x80008118
FP: 0x80005fac, PC: 0x80008064
FP: 0x80005fc4, PC: 0xfff03d70
FP: 0x80005ffc, PC: 0x00000000
FP: 0x00000000, PC: 0x00000000
```

- **meminfo**—Displays size in bytes, starting address, available range of main memory, the starting point and size of packet memory, and size of NVRAM; for example:

```
rommon 9> meminfo
Main memory size: 128 MB.
Available main memory starts at 0x10000, size 40896KB
IO (packet) memory size: 5 percent of main memory.
```

Exiting the ROM Monitor Mode

You must set the configuration register to a value from 0x2 to 0xF for the voice gateway to boot a Cisco IOS image from flash memory upon startup or reloading.

The following example shows how to reset the configuration register and cause the voice gateway to boot a Cisco IOS image stored in flash memory:

```
rommon 1 > confreg 0x2101
```

You must reset or power cycle for a new configuration to take effect:

```
rommon 2 > boot
```

The voice gateway boots the Cisco IOS image in flash memory. The configuration register changes to 0x2101 the next time that you reset or power cycle the voice gateway.

INDEX

Symbols

-? command A-4

? command A-3

A

Analog FXS user interfaces with Metro Ethernet interface 1-2

B

b command A-4

b flash command A-4

boot commands A-4

C

Cisco IOS 1-4, 1-5

commands

- -? A-4
- b A-4
- b flash A-4
- boot A-4
- confreg A-5
- context A-7
- dir device A-4
- frame A-8
- help A-3
- i A-4
- k A-7
- meminfo A-8
- reset A-4
- ROM monitor A-3
- ROM monitor debugging A-7, A-8
- ROM monitor diagnostics A-1
- setup 2-2
- show config 3-2
- stack A-7
- sysret A-8
- xmodem A-4, A-6

common command modes 1-4

configuration

- completing 2-5
- Voice over IP 4-1

configuration register

- changing from ROM monitor A-5

confreg command A-5

console download A-6 to A-7

context command A-7

controls, descriptions of 1-1, 1-2

D

debug commands, ROM monitor A-7, A-8

dir device command A-4

documentation iii-vii

E

error reporting, ROM monitor A-7

F

figures

Analog FXS User Interfaces with Metro Ethernet Interface 1-2

frame command A-8

G

global configuration command mode 1-5

H

help command A-3

host name 3-1, 3-2

I

i command A-4

interface configuration command mode 1-5

K

k command A-7

M

meminfo command A-8

P

privileged EXEC command mode 1-4

R

recovering boot and system images A-4

related documentation iii-vii

reset command A-4

ROM monitor

commands A-3

debug commands A-7, A-8

entering A-1

exiting A-8

S

setup command 2-2

show config command 3-2

stack command A-7

sysret command A-8

T

tables

Common Command Modes 1-4

TFTP download

See also console download

U

user EXEC command mode 1-4

V

virtual configuration register A-5

voice over IP

configuring 4-1

X

xmodem command A-4, A-6